

We Claim:

1. A photosensitive coating material for coating a substrate, comprising:

a base polymer;

a solvent;

a photoactive substance forming an acid upon irradiation with light; and

a fluorescent substance surrounded by at least one material and having a fluorescence property, the fluorescence property of said fluorescent substance changing in dependence on an acid fraction present in said at least one material.

2. The photosensitive coating material according to claim 1, wherein the fluorescence property designates a spectrum of the light re-emitted by said fluorescent substance.

3. The photosensitive coating material according to claim 1, wherein the fluorescence property designates an intensity of the light re-emitted by said fluorescent substance.

4. The photosensitive coating material according to claim 1 implemented as a chemically amplified coating material.

5. The photosensitive coating material according to claim 1 configured as a coating material sensitive for wavelengths of less than 157 nanometers.

6. The photosensitive coating material according to claim 1 formed with molecular chains, and wherein said photoactive substance and said fluorescent substance are parts of common molecular chains.

7. A radiation-sensitive coating material for coating a substrate, comprising:

a base polymer;

a solvent;

a radiation-active substance forming an acid upon irradiation with energetic radiation; and

a fluorescent substance having a fluorescence property, said fluorescent substance changing a fluorescence in dependence on an acid fraction present in a material surrounding said fluorescent substance.

8. A process for exposing a substrate in an exposure apparatus, which comprises the steps of:

providing a substrate coated with the radiation-sensitive coating material according to claim 7;

loading the substrate into an exposure apparatus having at least one first sensor for detecting light re-emitted by the fluorescent substance in the coating material within a first wavelength range;

starting a first exposure operation by projecting a pattern into the photosensitive layer;

firstly measuring a first intensity of light emitted by the fluorescent substance at a first point in time with the at least one first sensor;

at least once secondly measuring a second intensity of light emitted by the fluorescent substance at at least one second point in time, with the at least one first sensor;

comparing the first intensity with the second intensity; and

ending the exposure operation in dependence on a comparison result of the comparing step.

9. A process for exposing a substrate in an exposure apparatus, which comprises the steps of:

providing a substrate coated with the photosensitive coating material according to claim 1;

loading the substrate into an exposure apparatus having at least one first sensor for detecting light re-emitted by the fluorescent substance in the photosensitive coating material within a first wavelength range;

starting a first exposure operation by projecting a pattern into the photosensitive layer;

firstly measuring a first intensity of light re-emitted by the fluorescent substance at a first point in time with the at least one first sensor;

at least once secondly measuring a second intensity of light re-emitted by the fluorescent substance at at least one second point in time, with the at least one first sensor;

comparing the first intensity with the second intensity; and

ending the exposure operation in dependence on a comparison result of the comparing step.

10. The process according to claim 9, which comprises:

providing the exposure apparatus with at least one second sensor for detecting the light re-emitted by the fluorescent substance within a second wavelength range;

in the steps of the first measurement, detecting with the second sensor a third intensity of the radiation, and in the step of the at least one second measurement, detecting with the second sensor a fourth intensity of the radiation in the second wavelength range;

determining, from a comparison of the first and the third intensity, a first color value of the re-emitted light at the first point in time;

determining, from a comparison of the second intensity and the fourth intensity, a second color value of the re-emitted light at the second point in time;

comparing the first color value and the second color value;  
and

terminating the exposure in dependence on a comparison result in the comparing step.